
HUALAPAI TRIBE

UNIFIED WATERSHED ASSESSMENT
FOR THE
HUALAPAI RESERVATION

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HUALAPAI TRIBE

Prepared by:
The Hualapai Tribe Natural Resource Department
for the
Environmental Protection Agency
Region IX

January 1999

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1999 DRAFT HUALAPAI TRIBE UNIFIED WATERSHED ASSESSMENT AND WATERSHED RESTORATION PRIORITIES

**PREPARED BY:
HUALAPAI TRIBE**

NATURAL RESOURCES DEPARTMENT

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INTRODUCTION

The Clean Water Action Plan, published by the Environmental Protection Agency in February 1998, presents a broad vision of watershed protection and restoration for America's landscape. Included in the Clean Water Action Plan are specific goals and objectives for protecting the water quality and restoring ecosystem functions to surface freshwater, wetlands, and groundwater for natural resources by building upon the traditional clean water and human health objectives. The Clean Water Action Plan specifically identifies objectives for Tribal cooperation and coordination with state, federal and local entities along with other stakeholders. The objectives of Tribal and Federal coordination is to (1) identify watersheds with the most critical water quality problems, and (2) identifying ways that Tribes can work with other entities to focus resources and implement effective strategies to solve watershed and water quality problems.

The initial step in implementation of the Clean Water Action Plan by the Hualapai Tribe is through the development of a **Unified Watershed Assessment**. The purpose of the Unified Watershed Assessment is as follows: (1) categorize Reservation watersheds including areas used for fee-recreation and special tribal use areas; (2) define priorities for restoration and establish protocols for restoration strategies for selected watersheds pursuant to the Clean Water Action Plan; (3) provide administrative direction to the use of new resources available through the Fiscal Year 1999 Clean Water and Watershed Restoration Budget Initiative for the acceleration of coordinated watershed restoration; and, (4) assist in the cooperation of efforts between state, federal and local entities toward the goal of watershed restoration and protection. Figure 1 identifies the location of the Hualapai Reservation and its relationship to the Colorado River.

INFORMATION BASE USED IN CATEGORIZING AND PRIORITIZING THE HUALAPAI RESERVATION WATERSHEDS

Information utilized for determining and quantifying the categorization and prioritization of the Hualapai Reservation watersheds (Figure 2) include (but was not limited to) the following documents;

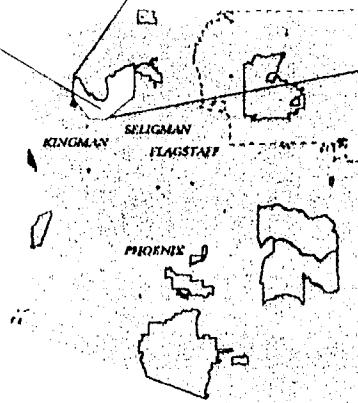
1. EPA's 1994 Section 303(d) List for the State of Arizona
2. Arizona's 303(d) list
3. EPA's Index of Watershed Advisors

Hualapai Indian Reservation, Arizona

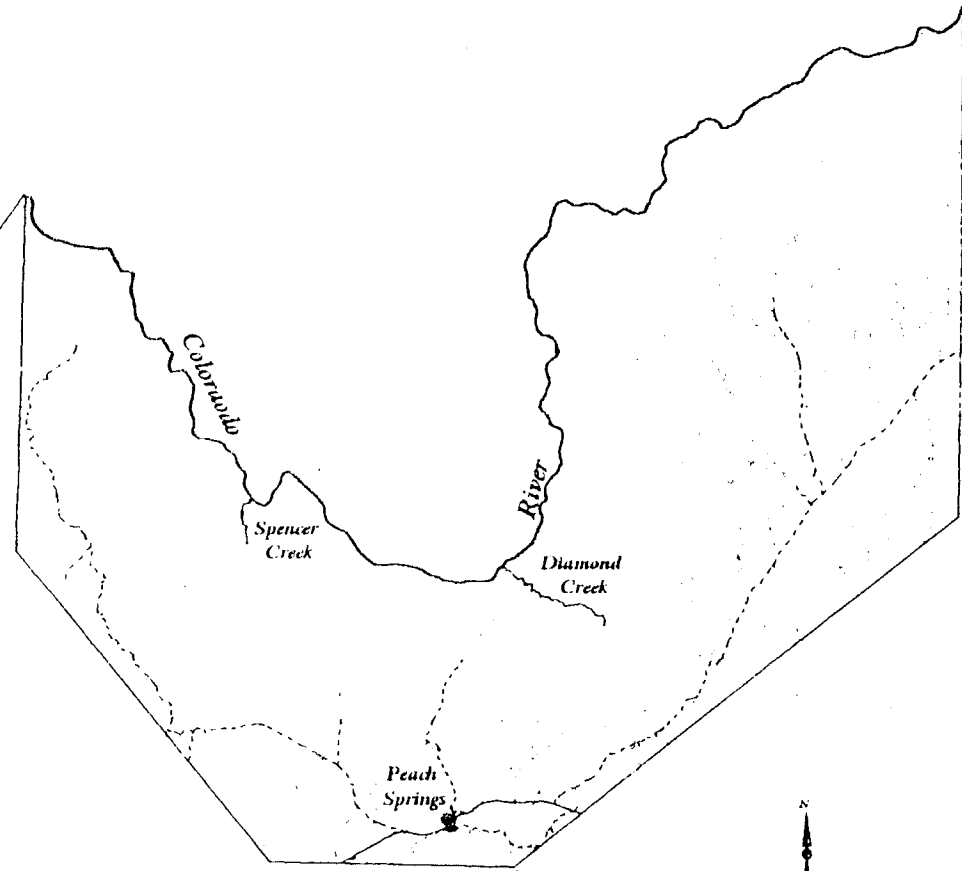
Figure 1: Location Map

Figure 1. Location map of the Hualapai Tribe Reservation, Arizona

Hualapai Indian Reservation



36 0 36 72 108 144 Miles

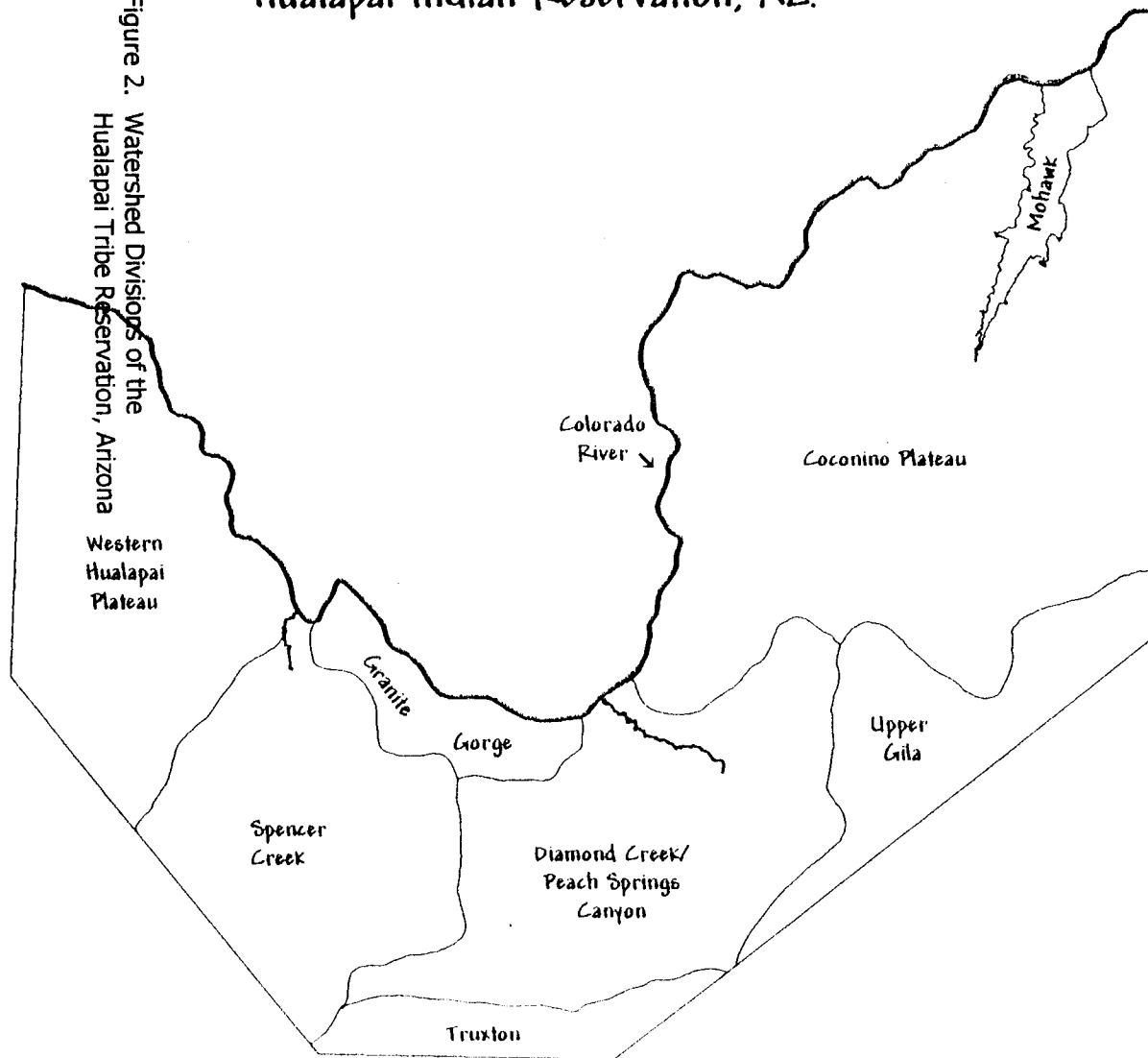


4.4 0 4.4 8.8 Miles



Watershed Divisions on the Hualapai Indian Reservation, AZ.

Figure 2. Watershed Divisions of the
Hualapai Tribe Reservation, Arizona



Watershed Total Acreages

Mohawk	- 16786.7 acres
Western Hualapai Plateau	- 153599.7 acres
Granite Gorge	- 32932.9 acres
Spencer Creek	- 134383.7 acres
Upper Gila	- 75543.6 acres
Truxton	- 34649.9 acres
Coconino Plateau	- 399720.8 acres
Colorado River	- 2304 acres
Diamond Creek/Peach Springs Canyon	- 168737.9 acres



4. Hualapai Tribe Water Quality Assessment 305(b) Report (1995)
5. Hualapai Tribe Spencer Canyon Watershed Analysis Management Plan Report (1998)
6. Hualapai Tribe's fish restoration program
7. Inventory of streams within Hualapai Reservation
8. Monitoring Protocols to Evaluate Water Quality Effects of Grazing Management on Rangeland Streams (EPA 1993)

The nine watersheds discussed in this document are located within five primary U.S. Geological Survey watershed units.

WATERSHED NAME	CATALOG UNIT NUMBER (HUC#)
Havasu Canyon	15010004
Hualapai Wash	15010007
Grand Canyon	15010002
Big Chino-Williamson Valley	15060201
Lake Mead	15010005

Source: Surf your Watershed web site - <http://www.epa.gov/surf2/hucs>

The development of the Unified Watershed Assessment for the Hualapai Reservation occurred through cooperative efforts of several partners including:

- Environmental Protection Agency, Region IX
- U. S. Geological Survey
- State of Arizona, Department of Environmental Quality
- The Hualapai Tribe

Additional watershed technical expertise was provided by outside technical consultants James Duffield and David L. Wegner.

DESCRIPTION OF CATEGORIES USED FOR THIS ASSESSMENT

Category I Watersheds in Need of Restoration: These watersheds do not now meet, or are not likely to meet, clean water and other natural resource goals, are watersheds critical to endangered and threatened species or areas of important Tribal cultural significance. Selection factors include:

- Presence of waterbodies within a watershed on a Section 303(d) list developed by the State of Arizona or the Hualapai Tribe.
- Watersheds determined by the Hualapai Tribe as areas critical to native and endangered species management and restoration.
- Watersheds listed as high priority by the Hualapai Tribe.
- Watersheds containing populations of native fish or containing critical habitat for aquatic or terrestrial species.

- Watersheds containing stream reaches determined by the Hualapai Tribe to be impaired or degraded.
- Watersheds described by EPA's Index of Watershed Indicators as having serious water quality conditions or watersheds described as having insufficient data to make an assertion of condition or vulnerability and specific condition or vulnerability criteria scores indicating more serious water quality problems.

Category II Watersheds Meeting Goals, Including Those Needing

Action to Sustain Water Quality: These watersheds meet clean water and other natural resource goals and standards and support healthy aquatic ecosystems. All such watersheds need continuing implementation of base clean water and natural resource programs to maintain water quality and conserve natural resources.

Category III Watersheds with Pristine or Sensitive Aquatic System

Conditions: These watersheds have exceptionally pristine water quality, drinking water sources, or other sensitive aquatic system conditions.

Category IV Watershed With Insufficient Data to Make an Assessment:

These watersheds lack data, critical data elements, or level of detail necessary to make a reasonable assessment.

The nine subbasins evaluated in this Unified Watershed Assessment all fall into the Category I, II and III watersheds. The Big Sandy subbasin is outside of the main Hualapai Watershed and has not had substantial evaluation. It is categorized additionally as a Category IV watershed unit. All watershed subbasins have some level of impact associated with land use activities. The Hualapai Reservation location and subsequently each of its watersheds and subbasins are to varying degrees important to endangered, threatened and at risk native species and to the Hualapai Tribe for economic reasons or because they provide unique habitats in the Southwest.

BASIS FOR PRIORITIZATION SUBBASIN WATERSHEDS

Prioritization of watersheds is initially made related to the I-IV Categories identified above (Table 1). The watersheds are categorized by considering Tribal, EPA Regional and State of Arizona restoration goals such as enhancement and protection of threatened and endangered species habitat, development of Total Material Development Limits (TMDL's), and development of protection, mitigation and enhancement measures for mainstem Colorado River management.

The Hualapai Tribe has established (Table 2) twelve specific criteria for evaluation based on watershed and subbasin impacts, threats and use characteristics. The evaluation of the specific criteria allows for the development of an assessment of subbasin health and quality and existing impacts. A scale of 1 to 12, with twelve being the highest impacts and therefore highest priority for action, has been established for the watershed subbasin assessments. Based on the defined criteria a quantitative ranking allows for categorization of the subbasins based on high, medium and low priority for action.

High: High priority watershed are Category I watersheds in immediate need of restoration and protection actions (within the next 2 years).

Medium: Medium priority watersheds are Category II and III watersheds in need of restoration actions within the next 5 years.

Low: Low priority watersheds are Category IV watersheds in need of restoration efforts which could occur beyond 5 years or require restoration of other watersheds to be meaningful or effective.

Table 1. Watershed Categorization and Ranking

Watershed Category	
High Priority (Category I)	12-9
Medium Priority (Category II)	8-5
Low Priority (Category III/IV)	4-0

TABLE 2
SAMPLE FORM
WATERSHED SUBBASIN EVALUATION CRITERIA
 (Criteria developed by the Hualapai Tribe)
 SUBBASIN: _____

Evaluation Criteria	Yes	No
1. Are any species designated in the watershed as threatened, endangered or at risk?		
2. Are there mining related impacts?		
3. Are human uses of groundwater impaired due to poor water quality?		
4. Are the upland range conditions deteriorating?		
5. Have cultural practices been impacted due to watershed degradation?		
6. Are grazing practices occurring which contribute to poor water quality?		
7. Are development activities declining the health of wetlands and riparian areas within the Reservation watershed? (urban, roads, etc.)		
8. Has there been a shift in riparian vegetation communities toward noxious or undesirable plant species, which have contributed to bank instability and sediment loading?		
9. Are the native fish and avifauna impacted?		
10. Is silviculture practices and fire suppression impacting the watershed?		
11. Are feral animals impacting spring water quality?		
12. Are recreational practices and uses impacting water quality?		
WATERSHED PRIORITY (determined by the number of positive responses)		
TOTALS		
Priority Ranking		

SUMMARY AND RECOMMENDATIONS

The Hualapai Tribe has evaluated each of the nine major subbasins that define the watershed of the Reservation. They have accomplished this evaluation by assessing specific criteria and impacts that are common to the Reservation. The Hualapai Reservation is unique in that it encompasses geomorphic units ranging from high elevation inter-montane vegetation types to Sonoran Desert types. These habitats support a wide variety of Tribal activities, cultural resource concerns and native species that are important to the Southwestern United States. With the objectives of the Unified Watershed Assessment defined the following rankings of the nine subbasins has resulted:

Watershed Subbasin	Category	Priority
Diamond Creek/Peach Springs	I	High
Coconino Plateau	I	High
Colorado River	I	High
Truxton	I	High
Western Hualapai	II	Medium
Upper Gila	II	Medium
Spencer Creek	II	Medium
Granite Gorge	III	Low
Big Sandy	III/IV	Low

Based on the above assessment we recommend that the four Category I, High Priority subbasins of the Hualapai Reservation Watershed be supported for additional study, evaluation and action.

CATEGORIZATION AND PRIORITIZATION OF WATERSHEDS OF THE HUALAPAI RESERVATION

The Hualapai Reservation is located in northwestern Arizona, predominantly in the Colorado River Main Stem surface water basin of Arizona. A small portion of the southeastern reservation is located in the upper Verde River surface water basin. The small segment of the reservation drains into the Red Lake Playa, a closed basin.

Precipitation on the reservation ranges from 10 to 25 inches per year. The reservation is drained primarily through intermittent flows with few perennial streams. The majority of the surface water flows north on the reservation and empties directly into the Colorado River and Lake Mead. Most drainages are intermittent with Spencer Creek and Diamond Creek the longest stream courses with perennial flow.

Spencer Creek is located in the west-central part of the Reservation and flows at an average rate of 11 cubic feet per second (cfs) (Hualapai 1995). Diamond Creek is located in the east-central portion of the Reservation and flows at a rate of approximately 1 cfs. Shorter, spring fed, perennial streams on the reservation include flows in Quartermaster Canyon, Travertine Canyon, and Bridge Canyon. These isolated springs support a unique assemblage of wetland and riparian plants, insects, amphibians and avifauna.

Administratively the Hualapai Tribe claims that their northern Reservation boundary extends to the center line of the Colorado River thereby including the Colorado as part of the surface water of the Hualapai Reservation. Presently this claim is in review by the Department of the Interior and the National Park Service. As of 1999 the resolution of these claims is still pending.

The Hualapai Reservation is divided into nine (9) nonpoint sources drainage subbasins based on geography and land use. For the most part these are discreet subbasins. Three of the subbasins, the Coconino Plateau, the Western Hualapai Plateau and Granite Gorge are a series of small parallel canyons that drain north into the Colorado River. These canyons do not constitute discreet drainage subbasins but are lumped together on the basis of proximity and similar land use and geology. Of the six remaining areas, one is the mainstem Colorado River, two are discrete drainage basins flowing into the Colorado River or Lake Mead, one drains into the Gila watershed, one drains into the closed Red Lake Playa basin and one is a small outlier of the Reservation near Trout Creek in the Bill Williams River drainage basin.

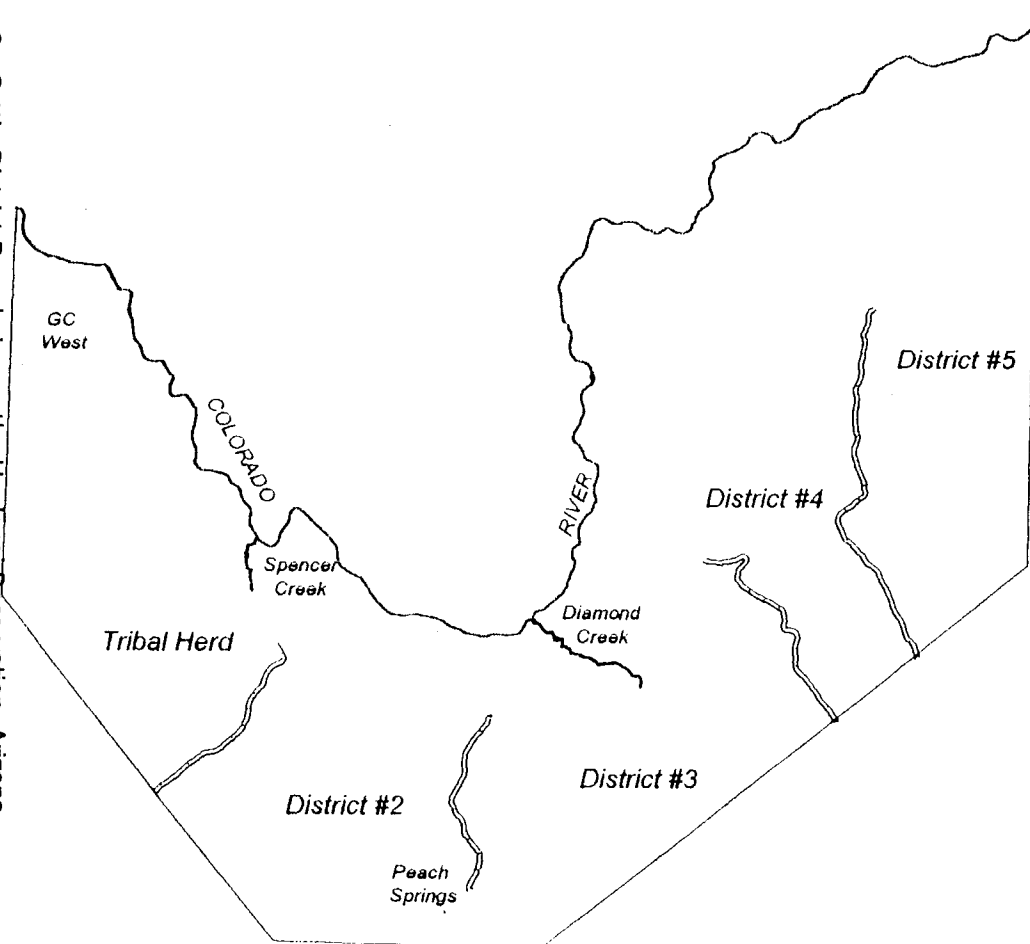
The Hualapai Tribe has five grazing units that overlie the drainage basins (Figure 3). The acreage for each of the five districts is identified in Table 3

Cattle District Boundaries on the Hualapai Indian Reservation, AZ.

Usable Range Land Acres

*Tribal Herd - 186,889 acres
District #2 - 136,770 acres
District #3 - 108,000 acres
District #4 - 168,790 acres
District #5 - 182,000 acres*

Figure 3. Cattle District Boundaries on the Hualapai Reservation, Arizona



 Valentine

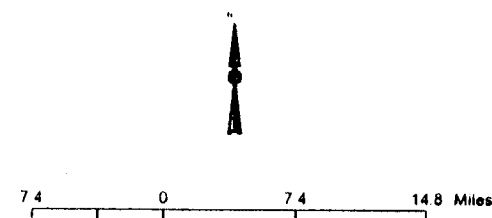


TABLE 3
Hualapai Tribe Livestock Grazing Units

Livestock Grazing Unit	Total Acreage
Unit No. 1	186,889 acres
Unit No. 2	136,770 acres
Unit No. 3	108,000 acres
Unit No. 4	168,790 acres
Unit No. 5	182,000 acres

SUBBASIN DESCRIPTIONS

1. Coconino Plateau Subbasin

Impact producing activities:

- Silviculture. Harvesting, reforestation, forest management, road construction, road maintenance, and other localized activities.
- Agriculture. Pasture land, feedlots, animal holding areas, animal management areas, rangeland, streambank erosion and other localized activities.
- Resource Extraction, Exploration and Development. Mining, streambank erosion and other localized activities.

The Coconino Plateau Subbasin (Figure 4) incorporates a large portion of the ponderosa pine (*Pinus ponderosa*) and pinyon-juniper (*Pinus edulis*)-(*Juniperus osteosperma*) forest of the northeastern Hualapai Reservation and covers approximately 620 square miles. The eastern border of the Coconino Plateau Subbasin abuts Grand Canyon National Park.

Three northeast trending drainages channel water to the Colorado River and include from east to west, National Canyon, Mohawk Canyon and Prospect Canyon. Prospect Canyon is the largest of the drainages with a length of approximately 20 miles. The Toroweap Monocline geologically controls Prospect Canyon with the drainage bottom composed of a thick sequence of Quaternary era alluvium. Access is available via a 4-wheel drive road to the rim of the inner gorge. Mohawk Canyon is defined by the Mohawk-Stairway fault and is approximately 9 miles long. It is a deeply eroded canyon that contains little alluvium. National Canyon is the furthest east of the canyons, parallels the Mohawk fault and exhibits deep erosion. Mohawk and National Canyons are very remote and only accessible by helicopter or by pack trail.

Populations of wild horses and burros live in the canyons and have had severe impacts on the vegetation and water resources. Groundwater occurs in the regional Muav Limestone aquifer and is perched in higher Paleozoic rocks.

The predominant land uses in the Colorado Plateau subbasin are recreation, cattle grazing and logging. An abandoned copper and uranium mine, Ridenhour Mine, is located in a remote section of this area, west of Prospect Canyon. The main nonpoint source pollution concerns in this region are increased sediment from grazing and logging operations and the potential for metals contamination from mine tailings. Elevated levels of boron in surface waters occurs and may be due to residues from slurry drops utilized to control forest fires.

Watershed Priority: High (10 ranking) - Table 4
Category I - in need of immediate action

Watershed Divisions on the Hualapai Indian Reservation, AZ.

Watershed Total Acres

Coconino Plateau - 399720.8 acres

Mohawk - 16786.7 acres

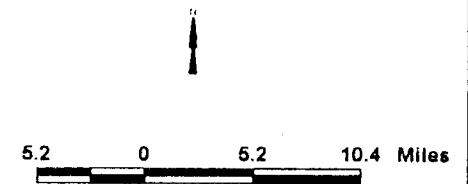
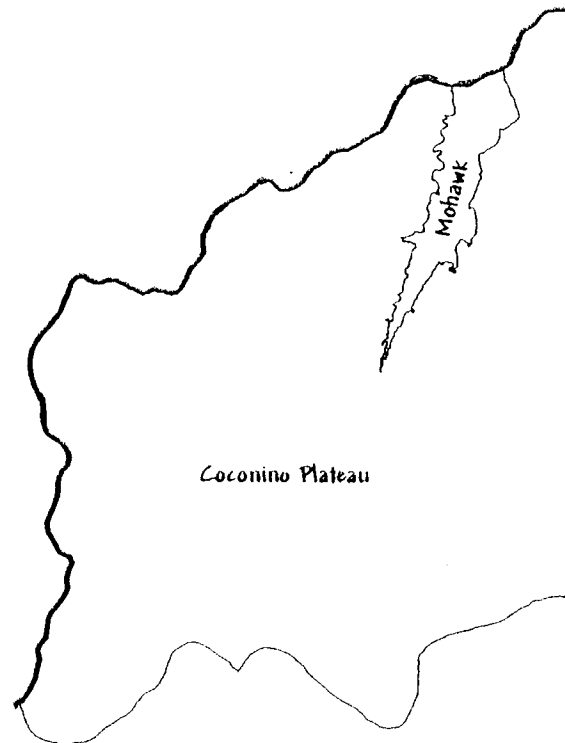


Figure 4. Coconino Plateau Subbasin Watershed, Hualapai Reservation, Arizona



Table 4.
WATERSHED SUBBASIN EVALUATION CRITERIA
 SUBBASIN: **Coconino Plateau Subbasin**

Evaluation Criteria	Yes	No
1. Are any species designated in the watershed as threatened, endangered or at risk?	X	
2. Are there mining related impacts?	X	
3. Are human uses of groundwater impaired due to poor water quality?		X
4. Are the upland range conditions deteriorating?	X	
5. Have cultural practices been impacted due to watershed degradation?	X	
6. Are grazing practices occurring which contribute to poor water quality?	X	
7. Are development activities declining the health of wetlands and riparian areas within the Reservation watershed? (urban, roads, etc.)	X	
8. Has there been a shift in riparian vegetation communities toward noxious or undesirable plant species, which have contributed to bank instability and sediment loading?	X	
9. Are the native fish and avifauna impacted?	X	
10. Is silviculture practices and fire suppression impacting the watershed?	X	
11. Are feral animals impacting spring water quality?	X	
12. Are recreational practices and uses impacting water quality?		X
WATERSHED PRIORITY (determined by the number of positive responses)		
TOTALS	10	2
Priority Ranking	High	I

2. Upper Gila Subbasin

Impact producing activities:

Silviculture. Harvesting, reforestation, forest management, road construction/maintenance, and other localized activities.

Agriculture. Crop production: irrigated, non-irrigated, and specialty; pasture land, feedlots, animal holding/management areas, rangeland, streambank erosion, and other localized activities.

This 140 square mile subbasin adjoins the Coconino Plateau to the south and drains into the upper Verde watershed of the Gila River basin (Figure 5). The upper part of the basin is forested and is geologically composed of consolidated sedimentary rocks exposed at the land surface. The lower part of the basin is an alluvial valley formed by down faulting along the Aubrey Cliffs. The drainage flows southeast across the Reservation boundary onto private land in the Aubrey Valley. All streams in this subbasin are ephemeral. Several shallow wells are located in the alluvial valley near Fraziers Well. These wells produce water for livestock and wildlife purposes. The shallow unconfined watertable puts these wells at risk to contamination from surface sources.

Groundwater occurs in the regional Muav Limestone aquifer, the Tertiary lacustrine, gravel and volcanic deposits and recent alluvium. Several wells are located in a high alluvial basin perched on the Paleozoic sedimentary deposits. Wells are shallow with depths to water of approximately 50 feet. The water usage is primarily for livestock and wildlife and an endangered fish rearing facility is being constructed this area. Water for the fish rearing facility will be supplied from a well drilled to the alluvial aquifer. An aquifer test was conducted on an unused well in this basin by the Hualapai Department of Natural Resources in 1995 to quantify the water resources available in the basin. The test indicated that production of 40 gpm continuously from the existing well is possible without significantly impacting other wells in the area.

Land use in this area is much the same as for the adjoining Coconino Plateau subbasin with cattle grazing, forestry, and recreation being the predominant uses. The primary nonpoint source pollutants in this basin are increased sediment load from cattle grazing and logging operations. Additionally, boron from fire suppression may be present. The presence of summer cabins for Tribal members, combined with a shallow water table increases the possibility of fecal coliform contamination of the alluvial aquifer.

Watershed Categorization: Medium Priority (7 total) - Table 5
Category II

Watershed Divisions on the Hualapai Indian Reservation, AZ.

Watershed Total Acres

Upper Gila - 75543.6 acres

Upper
Gila



2.8 0 2.8 5.6 Miles



Figure 5. Upper Gila Subbasin Watershed, Hualapai Reservation, Arizona

Table 5
WATERSHED SUBBASIN EVALUATION CRITERIA
 SUBBASIN: Upper Gila Subbasin

Evaluation Criteria	Yes	No
1. Are any species designated in the watershed as threatened, endangered or at risk?	X	
2. Are there mining related impacts?		X
3. Are human uses of groundwater impaired due to poor water quality?		X
4. Are the upland range conditions deteriorating?	X	
5. Have cultural practices been impacted due to watershed degradation?		X
6. Are grazing practices occurring which contribute to poor water quality?	X	
7. Are development activities declining the health of wetlands and riparian areas within the Reservation watershed? (urban, roads, etc.)	X	
8. Has there been a shift in riparian vegetation communities toward noxious or undesirable plant species, which have contributed to bank instability and sediment loading?		X
9. Are the native fish and avifauna impacted?		X
10. Is silviculture practices and fire suppression impacting the watershed?	X	
11. Are feral animals impacting spring water quality?	X	
12. Are recreational practices and uses impacting water quality?		X
WATERSHED PRIORITY (determined by the number of positive responses)		
TOTALS	7	5
Priority Ranking	Med	II

3. Diamond Creek/Peach Springs Canyon Subbasin

Impact producing activities:

Agriculture Pasture land, feedlots, animal holding areas, animal management areas, rangeland, streambank erosion, and other localized activities.

Construction Runoff. Highway, road and bridge construction, land development, streambank erosion, and other localized activities.

Urban Runoff. Surface runoff, streambank erosion, and other localized activities.

Recreation. Fecal contamination, soil erosion, and other localized activities.

The Diamond Creek/Peach Springs Canyon subbasin is located to the west of the Upper Gila subbasin and includes a portion of the community of Peach Springs (Figure 6). The subbasin covers approximately 300 square miles. In the eastern part of the subbasin one of the major perennial streams, Diamond Creek, is located and has a length of approximately 20 miles. The headwaters of Diamond Creek are in a remote canyon at the base of the Coconino Plateau. Flow is sustained by several large springs issuing from the Muav Limestone aquifer. Another large drainage, Peach Springs Canyon, is also located in this subbasin. It is an ephemeral drainage with its upper end at the community of Peach Springs. Diamond Creek flows into Peach Springs Canyon approximately 1.5 miles above its confluence with the Colorado River. Groundwater occurs in the regional Muav Limestone aquifer and recently deposited alluvium in the canyon bottom.

Land use in this subbasin is a mix of cattle grazing, recreation, and urban usage. Recreation use and subsequent impacts are elevated due to the availability of a road which reaches the Colorado River via Peach Springs Canyon. This road is the closest vehicle access to the Colorado River and is used extensively by commercial and private river boaters. Access for downstream river travel to Lake Mead is also via the Diamond Creek road and as a result attracts extensive numbers of trucks, tourists and river runners. The primary impact of nonpoint source pollutants in this area are sediment from grazing and construction, household chemicals, occasional spilled fuel and hydrocarbons from urban and transportation runoff and fecal coliform contamination related to recreational activities both in Diamond Creek and at the confluence with the Colorado River.

Watershed Categorization: High Priority (10 total) - Table 6
Category I

Watershed Divisions on the Hualapai Indian Reservation, AZ.

Watershed Total Acres

Diamond Creek/Peach Springs
Canyon - 168737.9 acres

Diamond Creek/
Peach Springs
Canyon

Figure 6. Diamond Creek/Peach Springs Subbasin Watershed, Hualapai Reservation, Arizona

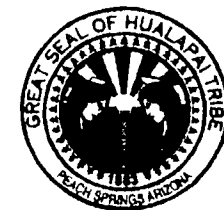


Table 6
WATERSHED SUBBASIN EVALUATION CRITERIA
 SUBBASIN: **Diamond Creek/Peach Springs Canyon Subbasin**

Evaluation Criteria	Yes	No
1. Are any species designated in the watershed as threatened, endangered or at risk?	X	
2. Are there mining related impacts?		X
3. Are human uses of groundwater impaired due to poor water quality?	X	
4. Are the upland range conditions deteriorating?	X	
5. Have cultural practices been impacted due to watershed degradation?	X	
6. Are grazing practices occurring which contribute to poor water quality?	X	
7. Are development activities declining the health of wetlands and riparian areas within the Reservation watershed? (urban, roads, etc.)	X	
8. Has there been a shift in riparian vegetation communities toward noxious or undesirable plant species, which have contributed to bank instability and sediment loading?	X	
9. Are the native fish and avifauna impacted?	X	
10. Is silviculture practices and fire suppression impacting the watershed?		X
11. Are feral animals impacting spring water quality?	X	
12. Are recreational practices and uses impacting water quality?	X	
WATERSHED PRIORITY (determined by the number of positive responses)		
TOTALS	10	2
Priority Ranking		

4. Truxton Valley Subbasin

Impact producing activities:

Agriculture Pasture land, feedlots, animal holding areas, animal management areas, rangeland, streambank erosion, and other localized activities.

Construction Runoff. Highway, road and bridge construction, land development, streambank erosion, and other localized activities.

Urban Runoff. Surface runoff, streambank erosion, and other localized activities.

Recreation. Fecal contamination, soil erosion, and other localized activities.

Land Disposal (runoff/leachate from areas). Sludge, wastewater, landfills, industrial land treatment, on-site wastewater systems (septic tanks, etc.) and other localized activities.

The 75 square mile Truxton Valley subbasin adjoins the Diamond Creek/Peach Springs Canyon subbasin and includes a portion of the community of Peach Springs (Figure 7). A limestone mine is located off the Reservation up gradient of the community. The community of Truxton is located down gradient in the Truxton Valley just across the Reservation boundary. The Tribe operates several water supply wells for the community in the Truxton Valley. A small, 1.5 square mile area outlier of the Reservation is located at Valentine, approximately 10 miles from the main body of the Reservation. A short section of Truxton Wash has perennial flow in this outlying section of the Reservation. This is the only area of perennial flow in this subbasin. Groundwater occurs from the Tertiary lacustrine, gravel and volcanic deposits which supply the municipal wells and in the recent alluvium near Valentine.

Land use in the Truxton Valley subbasin is primarily urban in the area of Peach Springs and ranching in the outlying areas. Potential nonpoint source pollutants are sediment and nitrogen from cattle grazing, animal shipping pens, construction and various impacts from urban development in the basin. A wastewater treatment plant and sewage lagoon are located in this subbasin, several old underground storage tanks have been removed, and there are reports of old dumping areas near the community. Presently the Burlington Northern-Santa Fe Railroad operates a mainline section of track through this area and transports a wide variety of materials, some of them hazardous through this subbasin. This could have a potential impact on the surface and groundwater in this area if a train derailment were to occur. Due to the concentration of the Tribal population and business uses in this subbasin it is likely to have the most diverse set of nonpoint source pollution problems on the Hualapai Reservation. Sediment, fecal coliform, metals, and miscellaneous chemical contamination are potential contaminants.

Watershed Categorization: High Priority (9 total) - Table 7
Category I

Watershed Divisions on the Hualapai Indian Reservation, AZ.

Watershed Total Acres

Truxton - 34649.9 acres

Truxton

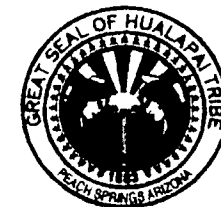
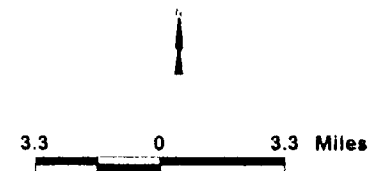


Figure 7. Truxton Valley Subbasin Watershed, Hualapai Reservation, Arizona

Table 7
WATERSHED SUBBASIN EVALUATION CRITERIA
 SUBBASIN: **Truxton Valley Subbasin**

Evaluation Criteria	Yes	No
1. Are any species designated in the watershed as threatened, endangered or at risk?	X	
2. Are there mining related impacts?		X
3. Are human uses of groundwater impaired due to poor water quality?	X	
4. Are the upland range conditions deteriorating?	X	
5. Have cultural practices been impacted due to watershed degradation?	X	
6. Are grazing practices occurring which contribute to poor water quality?	X	
7. Are development activities declining the health of wetlands and riparian areas within the Reservation watershed? (urban, roads, etc.)	X	
8. Has there been a shift in riparian vegetation communities toward noxious or undesirable plant species, which have contributed to bank instability and sediment loading?	X	
9. Are the native fish and avifauna impacted?		X
10. Is silviculture practices and fire suppression impacting the watershed?		X
11. Are feral animals impacting spring water quality?	X	
12. Are recreational practices and uses impacting water quality?	X	
WATERSHED PRIORITY (determined by the number of positive responses)		
TOTALS	9	3
Priority Ranking	High	I

5. Spencer Creek Subbasin

Impact producing activities:

Agriculture. Pasture land, feedlots, animal holding area, animal management areas, rangeland, streambank erosion, and other localized activities.

Construction Runoff. Highway, road and bridge construction, land development, streambank erosion, and other localized activities.

Recreation. Fecal contamination, soil erosion, and other localized activities.

Resource Extraction/Exploration/Development. Surface mining, streambank erosion, and other localized activities.

The Spencer Creek subbasin is located directly west of the Diamond Creek/Peach Springs Canyon subbasin and covers approximately 240 square miles (Figure 8). Spencer Creek is the largest perennial stream on the Reservation with its tributaries, Meriwhitica, Milkweed, and Hindu Canyons, draining a large area of the Hualapai Plateau. Groundwater occurs in the regional Muav Limestone aquifer and through the Tertiary lacustrine, gravel and volcanic deposits. The Tertiary limestone, gravels, and basalts represent the most productive aquifer on the Reservation. These deposits are of limited areal extent due to their deposition in channels incised into the surrounding Paleozoic sedimentary rocks. A pipeline and solar powered pumping station is currently being constructed from a well in Westwater Canyon to supply water to the far western end of the Reservation.

The Spencer Creek subbasin changes from high elevation pinon-juniper forest in the southern end to high-desert vegetation at the northern boundary of the Reservation at the Colorado River. A flagstone rock mine is operated in the subbasin upgradient of the Reservation on Bureau of Land Management controlled area. Many feral burros live on this part of the Reservation and impact the rangeland from overgrazing with eventual gullying and erosion. The predominant land uses in this subbasin are cattle grazing and recreation. The confluence of Spencer Creek and Lake Mead is a popular camping spot for Colorado River trips and recreational boaters coming up stream from Lake Mead. Many commercial and private boat groups stop here for lunch or to camp.

Two types of nonpoint source pollution are of greatest concern in the Spencer Creek sub-basin, sediment and fecal coliform. Sediment influx into surface water from a degraded watershed caused by cattle grazing, feral burros, and road construction has impacted the springs and streams in this area. The improvement of Buck and Doe Road has increased the sediment load in nearby streams. Fecal coliform bacteria is a potential problem at the mouth of Spencer Creek. Unrestricted camping in this area, no proper sanitary facilities, and no limit on the number of people who can utilize this area has created a problem with human waste buried in the beaches and urination in Spencer Creek. As Lake Mead reservoir level rises the Spencer Creek mouth is inundated and the fecal material is mobilized into the water column. This increases the potential for

human health problems such as skin rashes and intestinal disorders related to fecal coliform bacteria. In the summer of 1995 a similar situation at Lake Powell resulted in the closure of several popular recreation beaches. The Hualapai Tribe is exploring options to mitigate the human waste impact at the mouth of Spencer Creek.

This subbasin has been the subject of an extensive Watershed Area Management plan through EPA for the last year. During that time effort has been made to remove feral animals, fence holding areas for cattle and gather data and information on watershed response to restoration activities. This watershed, while still exhibiting impacts of past activities, is being restored.

Watershed Categorization: Medium (5 total) - Table 8
Category II

Table 8
WATERSHED SUBBASIN EVALUATION CRITERIA
 SUBBASIN: **Spencer Creek Subbasin**

Evaluation Criteria	Yes	No
1. Are any species designated in the watershed as threatened, endangered or at risk?	X	
2. Are there mining related impacts?		X
3. Are human uses of groundwater impaired due to poor water quality?		X
4. Are the upland range conditions deteriorating?		X*
5. Have cultural practices been impacted due to watershed degradation?	X	
6. Are grazing practices occurring which contribute to poor water quality?		X*
7. Are development activities declining the health of wetlands and riparian areas within the Reservation watershed? (urban, roads, etc.)		X
8. Has there been a shift in riparian vegetation communities toward noxious or undesirable plant species, which have contributed to bank instability and sediment loading?	X	
9. Are the native fish and avifauna impacted?	X	
10. Is silviculture practices and fire suppression impacting the watershed?		X
11. Are feral animals impacting spring water quality?		X*
12. Are recreational practices and uses impacting water quality?	X	
WATERSHED PRIORITY (determined by the number of positive responses)		
TOTALS	5	7
Priority Ranking		

* Activities presently being undertaken by the Hualapai Tribe to rectify the impact situation through EPA Region IX Watershed Area Management Program

Watershed Divisions on the Hualapai Indian Reservation, AZ.

Figure 8. Spencer Creek Subbasin Watershed, Hualapai Reservation, Arizona

Spencer
Creek

Watershed Total Acres

Spencer Creek - 134383.7 acres

2.5 0 2.5 5 Miles



6. Granite Gorge

Impact producing activities:

Recreation. Fecal contamination, soil erosion, and other localized activities.

This 45 square mile geographic area is located north of the Spencer Creek subbasin (Figure 9). It does not constitute a discrete subbasin but is a series of short canyons that drain a narrow rugged area along the Colorado River. All flow is to the north into the Colorado River through the rugged and isolated steep inner gorge of the Grand Canyon. The two main tributary canyons in this district are Separation and Bridge Canyon. Bridge Canyon is the only stream with perennial flow in this unit. It derives its flow from a spring a short ways up canyon from the Colorado River. Groundwater occurs in the regional Muav Limestone aquifer.

The predominant land use in this subbasin is recreation by boaters accessing the canyons from the Colorado River or Lake Mead. The topography is generally too rugged for cattle grazing. Nonpoint source pollutants in this area may include fecal coliform contamination of beaches by boating groups and possibly sediment problems in remote springs caused by feral burro grazing.

Watershed Categorization: Low Priority (4 total) - Table 9
Category III

Watershed Divisions on the Hualapai Indian Reservation, AZ.

Watershed Total Acres

Granite Gorge - 32932.9 acres

Figure 9. Granite Gorge Subbasin Watershed, Hualapai Reservation, Arizona

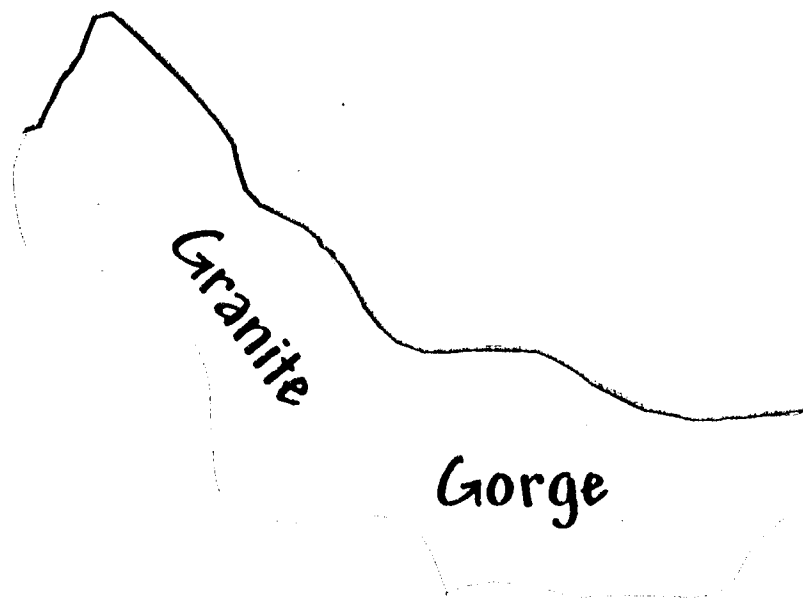


Table 9
WATERSHED SUBBASIN EVALUATION CRITERIA
 SUBBASIN: **Granite Gorge Subbasin**

Evaluation Criteria	Yes	No
1. Are any species designated in the watershed as threatened, endangered or at risk?	X	
2. Are there mining related impacts?		X
3. Are human uses of groundwater impaired due to poor water quality?		X
4. Are the upland range conditions deteriorating?		X
5. Have cultural practices been impacted due to watershed degradation?		X
6. Are grazing practices occurring which contribute to poor water quality?		X
7. Are development activities declining the health of wetlands and riparian areas within the Reservation watershed? (urban, roads, etc.)		X
8. Has there been a shift in riparian vegetation communities toward noxious or undesirable plant species, which have contributed to bank instability and sediment loading?	X	
9. Are the native fish and avifauna impacted?	X	
9. Are the native fish and avifauna impacted?	X	
10. Is silviculture practices and fire suppression impacting the watershed?		X
11. Are feral animals impacting spring water quality?		X
12. Are recreational practices and uses impacting water quality?	X	
WATERSHED PRIORITY (determined by the number of positive responses)		
TOTALS	4	8
Priority Ranking	Low	III

7. Western Hualapai Plateau

Impact producing activities:

Agriculture. Pasture land, feedlots, animal holding areas, animal management areas, rangeland, streambank erosion, and other localized activities.

Construction Runoff. Highway, road and bridge construction, land development, streambank erosion, and other localized activities.

Land Disposal (runoff/leachate from areas). Sludge, wastewater, landfills, industrial land treatment, on-site wastewater systems (septic tanks, etc.) and other localized activities.

The Western Hualapai Plateau subbasin is located directly west of the Spencer Creek subbasin and covers an area of approximately 190 square miles (Figure 10). It is similar to the Coconino Plateau subbasin in that it is not a discrete unit but a series of north trending small tributary drainages flowing into the Colorado River and Lake Mead which are lumped together due to proximity and similar land use. This area is predominantly high plateau incised by steep walled canyons draining to the north and the Colorado River. Drainages are seasonally ephemeral with the exception of a short section of Quartermaster Canyon which receives year round flow from Quartermaster Spring which issues from the regional Muav Limestone aquifer. Land use in this area is predominantly cattle grazing and recreation.

The Tribe operates an economic tourism enterprise at Grand Canyon West on the western boundary of the Reservation. Tourists are flown or bussed in from Las Vegas and provided day tours and interpretive lectures on Hualapai culture and environment. Water is trucked in and human waste and waste water is handled through septic systems. The Tribe hopes to expand the Grand Canyon West operation to include additional opportunities for tribal members. Potential nonpoint source pollution problems in this subbasin include sediment from grazing and feral burros and fecal coliform contamination from river related recreation on Lake Mead. The leach fields at Grand Canyon West may present a future hazard of fecal coliform contamination to remote springs in this area as development increases.

Watershed Categorization: Medium Priority (8 total) - Table 10
Category II

Watershed Divisions on the Hualapai Indian Reservation, AZ.

Watershed Total Acres

Western Hualapai
Plateau - 153599.7 acres

Western
Hualapai
Plateau

Figure 10. Western Hualapai Plateau Subbasin Watershed, Hualapai Reservation, Arizona

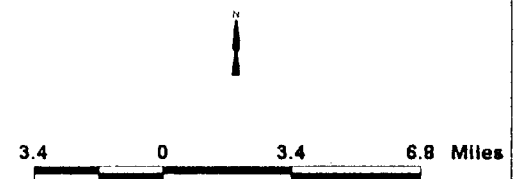


Table 10
WATERSHED SUBBASIN EVALUATION CRITERIA
 SUBBASIN: **Western Hualapai Subbasin**

Evaluation Criteria	Yes	No
1. Are any species designated in the watershed as threatened, endangered or at risk?	X	
2. Are there mining related impacts?		X
3. Are human uses of groundwater impaired due to poor water quality?		X
4. Are the upland range conditions deteriorating?	X	
5. Have cultural practices been impacted due to watershed degradation?	X	
6. Are grazing practices occurring which contribute to poor water quality?	X	
7. Are development activities declining the health of wetlands and riparian areas within the Reservation watershed? (urban, roads, etc.)	X	
8. Has there been a shift in riparian vegetation communities toward noxious or undesirable plant species, which have contributed to bank instability and sediment loading?	X	
9. Are the native fish and avifauna impacted?		X
10. Is silviculture practices and fire suppression impacting the watershed?		X
11. Are feral animals impacting spring water quality?	X	
12. Are recreational practices and uses impacting water quality?	X	
WATERSHED PRIORITY (determined by the number of positive responses)		
TOTALS	8	4
Priority Ranking	Med	II

8. Colorado River Subbasin

Impact producing activities:

Hydrologic Modification. Channelization and dredging, dam construction, streambank erosion, bridge construction, riparian modification, Lake Mead regulation and flow regulation and modification.

Recreation. Fecal contamination, soil erosion, hydrocarbons and other localized activities.

The Colorado River subbasin forms the northern boundary of the Hualapai Reservation (Figure 11). The main uses of the river are for the transfer of water downstream, hydropower generation and recreation. Nonpoint source pollution issues affecting the river are hydrologic modification, hydrocarbons from motor oil and gas, and fecal coliform contamination. The damming of the river upstream at Glen Canyon and downstream at Hoover Dam has changed the temperature, chemistry, flow pattern and sediment load of the river. Fluctuating flow releases from Glen Canyon Dam are routed directly downstream to the Hualapai reservation resulting in significant erosion of the sediment resources and resulting impacts to native species habitats, cultural resource areas, riparian zones and wetlands, and socially important areas for plant and mineral collection. Management and operation of Hoover Dam directly defines Lake Mead elevation. As the reservoir increased in storage, resources of the Hualapai Reservation are directly impacted by increased water levels. These include habitat for native and endangered species, culturally significant resource areas, wetlands, and margin riparian areas. These modifications directly impact the Hualapai Reservation resources and its people.

Fecal coliform contamination is less of a problem above the Diamond Creek confluence with the Colorado than below due to National Park Service (NPS) rules on human waste disposal. On Lake Mead such rules are not in place and with the heavy seasonal use of the river corridor presents a very high potential for improper waste disposal and the attendant health problems. The creation of Lake Mead has made a large area of the Hualapai Reservation accessible to jet skiers and motor boats. A NPS concessionaire operates large high speed shuttle boats for Colorado River trip passengers. The wakes from these boats cause substantial beach and riparian zone erosion with resulting increased sediment input along the Lake Mead shoreline.

The use of two cycle outboard motors in this subbasin has led to increased hydrocarbon pollution due to direct exhaust into the water and localized gasoline spillage. Motorboats, jetskies, houseboats and downstream traveling whitewater motor rafts all contribute to the direct and indirect impact of hydrocarbon pollution.

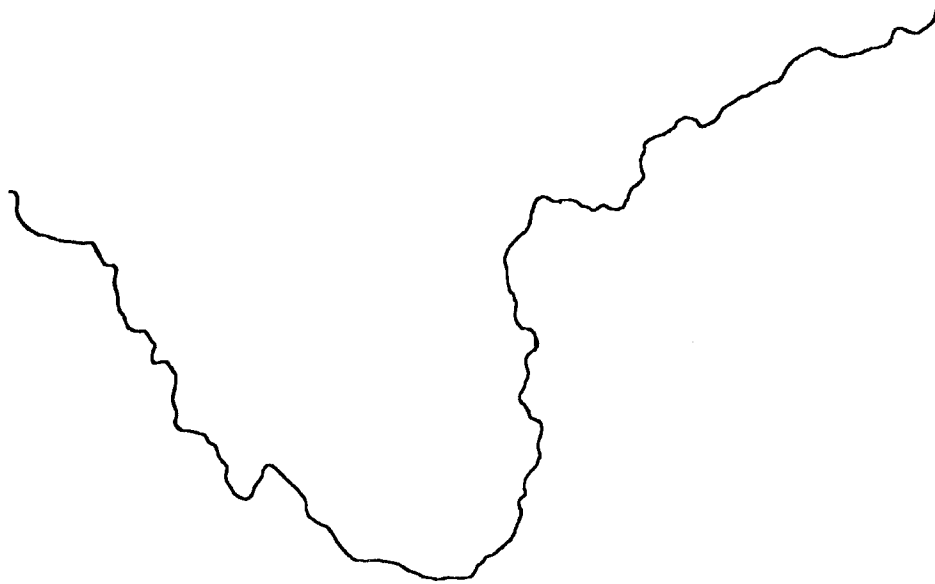
Watershed Categorization: High Priority (9 total) - Table 11
Category I

Watershed Divisions on the Hualapai Indian Reservation, AZ.

Watershed Total Acres

Colorado River - 2304 acres

Figure 11. Colorado River Subbasin Watershed, Hualapai Reservation, Arizona



10 0 10 Miles



Table 11
WATERSHED SUBBASIN EVALUATION CRITERIA
 SUBBASIN: Colorado River Subbasin

Evaluation Criteria	Yes	No
1. Are any species designated in the watershed as threatened, endangered or at risk?	X	
2. Are there mining related impacts?		X
3. Are human uses of groundwater impaired due to poor water quality?		X
4. Are the upland range conditions deteriorating?	X	
5. Have cultural practices been impacted due to watershed degradation?	X	
6. Are grazing practices occurring which contribute to poor water quality?	X	
7. Are development activities declining the health of wetlands and riparian areas within the Reservation watershed? (urban, roads, etc.)	X	
8. Has there been a shift in riparian vegetation communities toward noxious or undesirable plant species, which have contributed to bank instability and sediment loading?	X	
9. Are the native fish and avifauna impacted?	X	
10. Is silviculture practices and fire suppression impacting the watershed?		X
11. Are feral animals impacting spring water quality?	X	
12. Are recreational practices and uses impacting water quality?	X	
WATERSHED PRIORITY (determined by the number of positive responses)		
TOTALS	9	3
Priority Ranking	High	I

9. Big Sandy Unit

Impact producing activities:

This is a small outlier of the Hualapai Reservation that is located along the Big Sandy Wash approximately sixty miles south of the main body of the Reservation (Figure 12). It has a total area of approximately 60 acres. Grazing is not officially allowed on this portion of the Reservation however trespass cattle from adjacent allotments has resulted in increased erosion and subsequent loss of riparian vegetation. A potential nonpoint source impact might also be increased sediment from grazing upstream of the property. Limited information exists for the Big Sandy allotments and therefore additional study should be given to this subbasin.

Watershed Categorization: Low Priority (Total 2)-Table 12
Category III/IV

Hualapai Tribe Big Sandy Allotments

Figure 12. Big Sandy Unit Subbasin Watershed,
Hualapai Reservation, Arizona

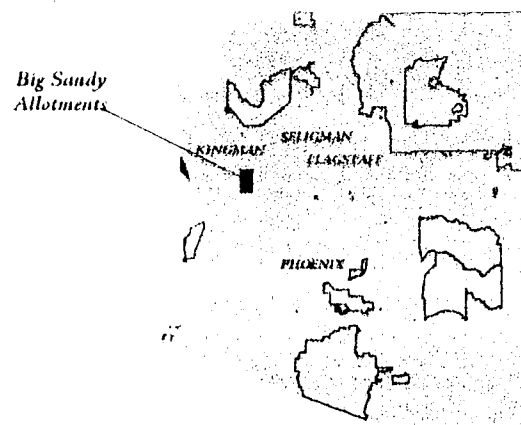
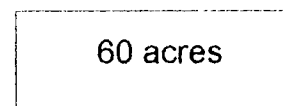
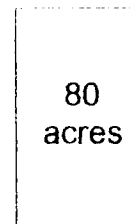
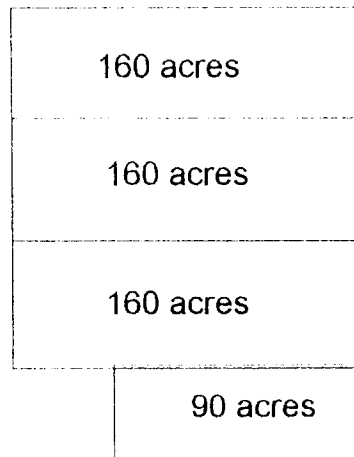


Table 12
WATERSHED SUBBASIN EVALUATION CRITERIA
 SUBBASIN: **Big Sandy Subbasin**

Evaluation Criteria	Yes	No
1. Are any species designated in the watershed as threatened, endangered or at risk?		X
2. Are there mining related impacts?		X
3. Are human uses of groundwater impaired due to poor water quality?		X
4. Are the upland range conditions deteriorating?	X	
5. Have cultural practices been impacted due to watershed degradation?		X
6. Are grazing practices occurring which contribute to poor water quality?	X	
7. Are development activities declining the health of wetlands and riparian areas within the Reservation watershed? (urban, roads, etc.)		X
8. Has there been a shift in riparian vegetation communities toward noxious or undesirable plant species, which have contributed to bank instability and sediment loading?		X
9. Are the native fish and avifauna impacted?		X
10. Is silviculture practices and fire suppression impacting the watershed?		X
11. Are feral animals impacting spring water quality?		X
12. Are recreational practices and uses impacting water quality?		X
WATERSHED PRIORITY (determined by the number of positive responses)		
TOTALS	2	10
Priority Ranking	Low	III

ACKNOWLEDGEMENTS

Development of this report has included the assistance of many individuals. The primary authors of this report, David L. Wegner and James A. Duffield, would like to acknowledge the assistance provided by Mr. Donald Bay, Dr. Kerry Christensen, Mr. Clay Bravo, Mr. Cisney Havatone, Ms. Annette Morgan, and Ms. Sharon Bravo of the Hualapai Natural Resources Department. The watershed subbasin maps were developed by Mr. Dushane Quasula of the Hualapai Wildlife, Fisheries, and Parks Program. Mr. Dillon Banerjee of Region IX Environmental Protection Agency provided initial input and guidance to the Unified Watershed Assessment analysis.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
WATER

Mr. Donald Bay
Hualapai Tribe
Department of Natural Resources
P.O. Box 300
Peach Springs, AZ 86434

Dear Mr. Bay,

We are in receipt of the Hualapai Tribe's Unified Watershed Assessment (UWA) for the Hualapai Reservation. We would like to thank you for your time and effort in developing this document.

Mr. Dillon Banerjee with the Environmental Protection Agency's Region 9 Office asked us to contact you if we wanted to either direct others to your website (if appropriate), or if we wished to scan your UWA and add them to all of the other's on the Internet. We also noted on your UWA you instruct any interested party to gain expressed written permission from your Tribe in such instances.

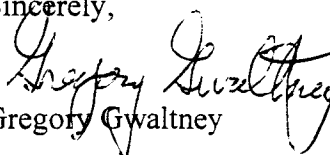
To that end we are writing you for your permission to either direct link to your website or scan in and add your UWA to all of the other UWAs already on the EPA Surf Your Watersheds State and Tribal Unified Watershed Assessment webpage.

<http://yosemite.epa.gov/water/surfnote.nsf/statetribaluwa?OpenView>

We have had great responses to the posting of all of the submitted UWAs on the Internet (56 States and Territories and 32 Tribes). States and Tribes enjoy looking at the other UWAs and have expressed interest in using other format types for any possible future UWA efforts.

Please let us know if we can add your UWA to that list. If you have any concerns or questions, please feel free to call me at (202) 260-9532.

Sincerely,


Gregory Gwaltney

cc: Dillon Banerjee, EPA Region 9

The Great Spirit created Man and Woman in his own image. In doing so, both were created as equals. Both depending on each other in order to survive. Great respect was shown for each other; in doing so, happiness and contentment was achieved then, as it should be now.

The connecting of the Hair makes them one person; for happiness or contentment cannot be achieved without each other.

The Canyons are represented by the purples in the middle ground, where the people were created. These canyons are Sacred, and should be so treated at all times.

The Reservation is pictured to represent the land that is ours, treat it well.



The Reservation is our heritage and the heritage of our children yet unborn. Be good to our land and it will continue to be good to us.

The Sun is the symbol of life, without it nothing is possible - plants don't grow - there will be no life - nothing. The Sun also represents the dawn of the Hualapai people. Through hard work, determination and education, everything is possible and we are assured bigger and brighter days ahead.

The Tracks in the middle represent the coyote and other animals which were here before us.

The Green around the symbol are pine trees, representing our name Hualapai - PEOPLE OF THE TALL PINES -

HUALAPAI NATION OFFICE OF THE CHAIRMAN

Earl Havatone
Chairman

P.O. Box 179 • Peach Springs, Arizona 86434 • (520) 769-2216

Edgar B. Walema
Vice Chairman

March 17, 1999

Mr. Gregory Gwaltney

U.S. Environmental Protection Agency
Office of Water
Washington, D.C. 20460
cc: Dillon Banerjee

Dear Mr. Gwaltney,

The Hualapai Tribe has approved for you to scan in the Hualapai Unified Watershed Assessment and place on your webpage EPA Surf Your Watersheds. Thank you for your patience in this matter and your interest in the Hualapai Tribe.

Please don't hesitate to contact me if you need further assistance or contact Donald E. Bay at (520) 769-2254.

Sincerely,

Earl Havatone
Earl Havatone, Chairman
Hualapai Tribal Council

REGULAR COUNCIL MEETING
March 06, 1999
9:00 a.m.

Secretary: Salena Siyuja

Roll Call taken (9) members present constituting a quorum. The meeting was called to order at 9:21 a.m.

Present:

Others:

Earl Havatone, Chairman
Edgar B. Walema, Vice-Chair
Alex Cabillo
Cisney Havatone
Monza Honga
Carrie Imus
Sylvia Palmer
Dallas Quasula
Sheri Yellowhawk

Watershed Analysis - Cisney Havatone

Alex moved to allow EPA to put Hualapai Tribe Unified Watershed Assessment on the website. Seconded by Sheri Yellowhawk. Vote 9 in favor